STATE OF VERMONT
PUBLIC SERVICE BOARD

Petition of Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc., for amendment of their Certificates of Public Good and other approvals required under 10 V.S.A. §§ 6501-6504 and 30 V.S.A. §§ 231(a), 248 & 254, for authority to continue after March 21, 2012, operation of the Vermont Yankee Nuclear Power Station, including the storage of spent-nuclear fuel	)))))))	July 17, 2009 Docket No. 7440

NEW ENGLAND COALITION'S PROPOSED FINDINGS OF FACT AND BRIEF

NOW COMES The New England Coalition, Inc. ("NEC"), by and through its attorney, Jared M. Margolis, and hereby submits the following Proposed Findings of Fact and Brief in the above-captioned proceeding.

I. INTRODUCTION

The Petitioner has come before this Board seeking a Certificate of Public Good (CPG) to allow the Vermont Yankee Nuclear Power Station (VY) to operate for an additional 20 years beyond its original license period, and to store additional spent nuclear fuel on-site. This requires the Board to balance the costs and benefits of extended operation, and to determine, pursuant to 30 V.S.A. §§ 231(a), 248 & 254, if it is in Vermont's best interests to endure not only 20 more years of nuclear power generation, but to add to the unknown and potentially intergenerational term of nuclear waste storage in our State. NEC believes the benefits Entergy claims, both environmental and economic, are limited and indefinite, however the costs of continued operation are potentially enormous. It is therefore not in the best interests of Vermont to allow for 20 more years of operation.

The Board is further being asked to conduct this balance without adequate information with which to fully evaluate the potential costs and benefits of the extended operation of VY. The Petitioner in this case (also referred to herein as "Entergy" or "ENVY") has plainly not met its burden to provide the Board with sufficient or definitive information on many of the components of 30 V.S.A. §§ 248 or 254. The Petitioner has failed to meet their burden to show that there will be any tangible economic benefit from the Revenue Sharing Agreement (RSA); they have failed to show that continued operation will not have an undue adverse impacts on air, water, wetlands, educational or transportation resources; they have failed to show that there will be adequate funds for decommissioning; and they have failed to demonstrate that they can operate the plant reliably through the relicensing period. This failure of the Petitioner to meet their burden under the applicable statutory criteria requires denial of the Petitioner's request for a CPG.

II. CRITERIA UNDER 30 V.S.A. § 248(b).

1. 30 V.S.A. § 248(b)(4) Economic Benefit to the State.

Findings:

1. There is currently no Power Purchase Agreement (PPA) between Vermont Utilities and VY for the purchase of power past 2012. Absent a PPA, Vermont utilities would be required to purchase electricity generated from VY at market rates, with no guarantee as to what those prices may be, or how much of VY's output would be made available to them.

2. Entergy is relying on the potential proceeds from the Revenue Sharing Agreement (RSA) contained in the Memorandum of Understanding from Docket 6545 (the Sale MOU), which provides for a sharing of 50% of revenues with Vermont Yankee Nuclear Power Corporation for the sale of electricity generated by VY above a certain price, designated as the Strike Price, as well as employment and taxes as a basis for meeting the economic benefit requirements of 30 V.S.A. § 248(b)(4). Wigget Mar. 3 Pf.; Thayer Mar. 3 Pf.; Heaps Mar. 3 Pf.
3. The RSA only provides for revenue sharing for the first ten years of operations into the relicensing period. Tr. 5/20/09 at 13 (Wiggett).
4. Current energy prices are below the strike price. Tr. 6/02/09 at 99 (Deehan).
5. Forward energy prices have fallen significantly in the past year. Chernick Feb. 11 Pf. at 24; Lamont Feb. 11 Pf. at 15.
6. The value of the RSA to Vermont utilities and ratepayers has the potential to be negligible or amount to no benefit at all. If market rates remain below the Strike Price, or should Entergy sell electricity below the Strike Price regardless of market prices, then there would be no benefit under the RSA. Tr. 5/20/09 at 15, 20 (Wiggett). The Petitioner failed to include this scenario in their analysis. *Id.* at 21.
7. Nothing in place at this time prevents Entergy from selling electricity to a marketing affiliate below the Strike Price, regardless of market prices. Tr. 5/20/09 at 23 (Wiggett); Tr. 6/2/09 at 103 (Deehan).

8. The economic benefits provided by VY would cease if the plant were unable to operate, and would be greatly diminished if the plant had to operate at a lower output level, due to any system or component problems or failures. Tr. 6/3/09 at 51 (Lamont).
9. If VY were to be denied a CPG, it would encourage alternative energy generation sources to be instituted to replace the electricity now purchased from VY, creating jobs and tax revenue for Vermont. Tr. 5/19/09 at 168-169 (Heaps).

Discussion:

The fact that there is no PPA between VY and Vermont utilities puts Vermont ratepayers in the unenviable position of hosting an aging nuclear power plant, without commensurate economic benefits in the form of real and tangible savings on purchasing electricity. NEC agrees with both the Department of Public Service ("DPS" or the "Department") as well as CLF and VPIRG that the failure to reach a PPA providing below market prices to VT ratepayers clearly does not allow for a finding by the Board that the continued operation of VY will provide the economic benefits to the State of Vermont required for a showing pursuant to 30 V.S.A. § 248(b)(4) that the Petitioner is entitled to a CPG. This issue has been adequately covered by CLF in their brief, and NEC hereby supports CLF's legal argument that a favorable power contract is essential for a finding of economic benefit pursuant to 30 V.S.A. § 248(b)(4). NEC submits the following additional comments regarding economic benefits.

The Petitioner's reliance on the RSA to meet their burden to show that the continued operation of the VY facility will provide an economic benefit to the state of Vermont pursuant to 30 V.S.A. § 248(b)(4) is unfounded. The Board was presented with widely varying estimates regarding the potential value of the RSA, with much disagreement between the parties regarding

the potential future market price of electricity, as well as how the Strike Price will change after 2013 due to the escalation factors contained in the Docket 6546 MOU. It therefore remains unclear how valuable the RSA may be to Vermont ratepayers. These issues are not within NEC's expertise, so we make no claim as to what the actual value of the RSA might be; however it is clear that the Board must consider the value of the RSA as purely speculative at this point.

What is plainly evident, however, is that all parties agree that it is possible for the value of the RSA to be zero or negligible, depending on how these several factors play out in the future. There remain many uncertainties regarding the potential value of the RSA, first and foremost of which is that we have no idea how market prices for electricity will fluctuate in the coming years. The assumptions provided to the Board assume very specific future pricing in a very volatile and unstable market. The expert's predictions are just that, predictions. If in reality the market prices remain below the Strike Price, there is no benefit to Vermont from the RSA. Any number of events might keep market prices below the Strike Price, and the RSA is simply not enough to provide Vermont with assurances of an economic benefit from the continued operation of VY. *In re: Amended Petition of Deerfield Wind, LLC*, Docket No. 7250, Order of 4/16/09 at 43-44 (Board will not consider economic benefits that petitioner cannot adequately quantify or prove).

It is also troubling that nothing in place at this time would prevent Entergy from selling electricity to an affiliate or other party at below the Strike Price, regardless of market prices, thereby avoiding having to share revenues under the RSA. Entergy may enter into power purchase agreements with other utilities outside of Vermont for the sale of electricity below the Strike Price, or might attempt to avoid RSA payments using an affiliate to sell electricity on the

market, and selling to that party at below the Strike Price. NEC is not insinuating that this is the Petitioner's plan; however it is yet another basis for concluding that the RSA does not provide any firm assurances of economic benefit to Vermont from the continued operation of VY.

Furthermore, the RSA will provide absolutely no benefits for the second half of the 20-year relicensing period requested by the Petitioner – a period during which it may be reasonably expected that plant reliability will decrease. As it is written, it only provides for revenue sharing through 2022, and then Vermont would be faced with 10 years of further operation, the economic benefits of which are based solely on the jobs, tax revenue and economic contribution to the region stemming from the operation of VY. Reliance on these benefits for a full 20 years of operation is similarly unfounded, and the Board should not find that these provide enough of a benefit to justify the continued operation of VY. *See In re: Amended Petition of Deerfield Wind, LLC*, Docket No. 7250, Order of 4/16/09 at 43 (stating that tax and employment benefits alone – absent a PPA – are not sufficient to outweigh environmental burdens).

As Mr. Lamont stated, Vermont is faced with unique risks by hosting a nuclear power plant in our state. NEC believes that those unique risks have become a burden that Vermont should not tolerate. Issues regarding reliability of the plant, and the many failures of management to ensure that the plant can be operated effectively into the future (discussed further below) indicate that on balance, VY is not going to benefit Vermont if it is granted an extended license. The issue of reliability effects how this Board should view the economic benefits touted by Entergy. The jobs that VY provides, the taxes that are paid, the ancillary spending and economic stimulus in the community and region that Entergy claims as benefits to Vermont from continued operation will almost entirely disappear the day VY stops operating. The economic

benefits provided by VY are therefore intimately tied to the reliability of the plant, as well as the potential decision by Entergy (or Enexus) to shut down VY should it become too expensive to operate.

It is therefore clear that the Board must be certain that the plant can operate reliably and economically into the future. ENVY has a history of mishaps and failures that have affected plant reliability (see discussion below). We have seen that large components, such as the condenser, need to be replaced as part of aging management (also below). Entergy witnesses stated that a cost/benefit analysis would need to be done regarding the replacement of certain components as the plant moves towards the end of licensing, and it cannot be ignored that a decision to shut the plant down in the face of expensive repairs or component replacement is possible. As the plant ages, more and more components will reach or exceed their useful life, and the potential for reliability issues and for a decision to be made to discontinue operating the plant in the face of expensive restoration (especially if market prices for electricity fall) become more likely. The Board cannot, therefore, rely on 20 years of continued operation in calculating the economic benefits of relicensing, and must consider the possibility that VY will not actually operate for 20 years if granted a CPG, and discount the benefits claimed by Entergy accordingly.

That is not to say, as some have claimed, that the economic benefits provided by VY represent the economic loss to Vermont should VY not be relicensed. On the contrary, the VY site is a prime industrial location and, should Entergy fulfill its promises regarding site restoration, its reuse in the future will continue to provide tax revenue and jobs to Vermont. Similarly, the loss of electrical generation currently provided by VY will incite the creation of renewable generating facilities, such as wind farms, to fill the gap. This will provide jobs and

economic stimulus across Vermont, and further provide for alternative low or no carbon emitting electricity generation that would be consistent with the Vermont Energy Plan.

Regardless of the potential reuse of the site,[1] the foremost concern of this Board regarding the potential economic impacts of their decision should be that adequate information has not been provided by the Petitioner or DPS. Absolutely no studies or comparisons have been conducted on the economic effects of the closure of other similar facilities, such as Maine Yankee. In fact, it appears that the Department went out of their way to avoid looking at such information, with Mr. Vanags admitting that he knew of or received at some point a study on the economic impacts of the closure of Maine Yankee on the region; however this report was not reviewed or assimilated into the Department's analysis. Tr. 6/2/09 at 259-260 (Vanags); Tr. 6/1/09 at 57 (Nagle). The Department's economic analysis therefore made no comparison to other sites, and did not examine any real world data regarding the economic impacts of plant closure.

The true burden, however, is not on DPS, but rather on the petitioner. *In re: Champlain Pipeline Co.,* Docket No. 5300, Order of 8/21/89 at 47 (stating that the petitioner bears burden of proof to show that they satisfy all elements of § 248); see also *Petition of Central Vermont Public Service Corp.*, Docket No. 4782, Order of 4/10/86 at 7 ("The burden of proof is, of

[1] NEC would point put that the many engineers currently at VY could form their own engineering group and thereby continue to provide Vermont and the region with their services as we move towards safer and more reliable alternative means of electrical generation. NEC suggests that the Board require Petitioners to provide a study/report on the feasibility of re-use of the VY office complex in Brattleboro as a nuclear engineering and training center to offset economic impacts such as employment reduction, should ENVY not get a full 20 year extension or should equipment/component failures cause a shutdown between now and 2032.

course, upon the petitioners with respect to each element of their case."). Mr. Heaps, on behalf of Entergy, has made very specific claims regarding the loss of jobs and the wage impacts of relicensing versus a 2012 shutdown scenario. He further provides very specific demographic and tax revenue implications of these two scenarios, and the overall economic implications of a 2012 shutdown versus continued operation. Yet Mr. Heaps, apparently preferring theory and extrapolation to the lessons of real experience, conducted no comparative analysis to any other location, even though he was aware that other nuclear plants in New England have been shut down in recent years, such as Maine Yankee. In fact, Mr. Heaps has not himself conducted an economic impact analysis for the shutdown of any other similar facility, and admitted to not having consulted any other studies, or even being unaware of any such studies. Tr. 5/19/09 at 161-162 (Heaps).

The Petitioner's failure to provide any analysis or comparison to real world examples regarding the economic consequences of the Board's decision in this matter is staggering. Mr. Heaps claims that the analysis was undertaken based on a model used to assess the economic impacts of many projects in Vermont, however the only example he was able to provide regarding projects of this scale was an assessment of the potential closure of IBM; however IBM did not close, so the analysis was purely hypothetical, and the accuracy of the model could not be verified or even assessed. *Id.* at 163-164. There is therefore little basis for accepting the statements and analysis provided by the Petitioner, and no reason to believe that the information is accurate. *Petition of Green Mountain Power*, Docket No. 5823, Order of 5/16/96 at 42 (the Board must base its determinations on sufficient and credible evidence regarding compliance with the § 248 criteria).

NEC believes that the Board should find that the Petitioner has not shown that the relicensing of VY will provide adequate economic benefits to Vermont, and therefore has not met its burden under 30 V.S.A. § 248(b)(4), and a CPG cannot not be issued. However, in the alternative, the Board should require that, prior to issuing a decision on the CPG, the Petitioner must provide the Board with adequate information to base its decision regarding the economic impacts of closing down VY. NEC would propose that the Board require the Petitioner to conduct a study and issue a comparative report on the economic impact of nuclear power plant closures in Massachusetts, Connecticut, and Maine. This should include: impact on the local economy (municipality and county and/or thirty mile radius) and state economy; impact on the cost of electricity in the affected state and in New England (ISO New England Territory). Economic indicators should include: household income, employment, housing and construction starts, sales tax, welfare roles, food stamp use, mortgage defaults, tax valuations, loan issuances, savings, and so on, indexed against comparable national figures. A comparison of baseline figures for individual locales should also be included.

The only way for this Board to be able to assess the true economic consequences of their decision is to be provided with real world information, and an accurate comparative analysis using the experiences learned at other sites. As it stands now, the Board is being asked to rely on unsubstantiated, and thus potentially misleading, information and absent the ability to make an informed decision on these issues, the Board should find that there is no basis to conclude that the Petitioner has provided valid information to substantiate their claims under 30 V.S.A. § 248(b)(4). The Board must therefore deny the CPG, or require additional information, as discussed above, from the Petitioner.

2. 30 V.S.A. § 248(b)(5) Aesthetics, Historic Sites, Air and Water Purity, the Natural Environment and the Public Health and Safety.

a. Air Pollution [10 V.S.A. § 6086(a)(1)]

Findings:

10. The Vermont Agency of Natural Resources (ANR) requires Air Pollution Control Permits for facilities that emit more than 10 tons of emissions per year. Garabedian Feb. 11 Pf. at 2-3
11. Air emissions at VY come from multiple sources, including the large heating boilers, the waste oil furnaces, and solvent cleaning operations. Tr. 6/1/09 at 178-179 (Garabedian).
12. ANR does not directly monitor the emissions at VY, but rather relies on engineering estimates to calculate the emissions. *Id.* at 180. These calculations do not include emergency diesel generator testing. *Id.*
13. Because the engineering estimates (based on information supplied by ENVY) indicate that the 10-ton trigger is not met, ANR does not conduct any dispersion modeling or ambient concentration analysis for VY. Id at 191-192.
14. ANR relies on Entergy to provide an opt-out letter to report if they will go over the 10-ton trigger necessitating an Air Pollution Control Permit. Entergy does not track emissions through direct monitoring, but relies on fuel consumption as a surrogate for estimating emissions. *Id.* at 180-181.
15. Emissions from VY include cooling tower drift, which contains particulate matter as well as treatment agents such as biocides, including dodecylguanadine hydrochloride. *Id.* at 182. The cooling tower emits 9.2 tons per year. Tr. 6/1/09 at 197-198 (Young).

16. ANR estimates that four pounds of dodecylguanadine hydrochloride may be emitted each year in VY's cooling tower plume; however ANR does not directly monitor the emissions of dodecylguanadine hydrochloride, and does not monitor the effects of dodecylguanadine hydrochloride on surrounding biota, even though it may settle onto the ground and into the water. *Id.* at 182-183.
17. ANR also controls the release of Hazardous Air Contaminats (HACs), and has stated that the release of HACs at VY does not warrant additional oversight because the releases are below what ANR calls the "action level." *Id.* at 183-184. The ANR witness was unable to provide information regarding what the action level is, or how close VY is to meeting it. *Id.*
18. HACs are not directly monitored by ANR, and emission levels are merely estimated. *Id.*
19. ANR witness Garabedian stated that "With regard to air pollution regulated under state and federal Clean Air laws; this faculty (sic) will not create undue air pollution." Garabedian Feb. 11 Pf. at 3.
20. There are several sources of air pollution not regulated under state and federal Clean Air laws, including emissions from vehicles of employees, welding and heavy machinery. Tr. 6/1/09 at 185-186 (Garabedian).

Discussion:

The Petitioner has not met its burden under 30 V.S.A. § 248(b)(5) to show that the continued operation of VY will not cause undue air pollution.

The emissions of biocides and particulate matter in the VY cooling tower drift as well as through the use of oil-fired burners and emergency diesel generators, release potentially adverse

and dangerous chemicals into the air, which the Vermont Agency of natural Resources (ANR) regulates. NEC is not convinced that the oversight provided by ANR is adequate, or that the information provided by the Petitioner gives any assurance that the continued operation of the site will not pose undue air pollution. NEC is concerned that the Petitioner has provided scant information on this issue, and therefore has not met its burden to show that 30 V.S.A. § 248(b)(5) has been met.

NEC is very concerned that the facility is not subject to an Air Pollution Control Construction or Operating Permit, and therefore no dispersion modeling or ambient concentration analysis is conducted at VY. It has been stated that the facility's emissions are below the 10 ton trigger for this permit, however this has not been subject to direct monitoring, but rather is an engineering estimate by ANR.

It is also not clear exactly how much VY actually emits. In redirect questioning of ANR witness Mr. Young by attorney for ANR Mrs. Dillon, it was stated that the emission information supplied by the Petitioner to ANR suggested that the facility emits around 4.4 tons, however it was then stated that the emissions from the cooling tower were 9.2 tons. Tr. 6/1/09 at 197-198. It remains unclear how this indicates that the facility emits less than 10 tons per year. It also remains unclear why the Petitioner's information suggests that only 4.4 tons are emitted, yet ANR stated that 9.2 tons are emitted by the cooling tower alone, or why these emissions are not all counted towards the trigger to require a permit. In order to establish that an Operating Permit

would not be required, the Board should seek more information to establish why the 10 ton trigger is not met when there are seemingly 13.6 tons emitted by VY.[2]

This is also true for the emission of hazardous air contaminants (HACs), which are regulated by ANR, however the ANR witness was unable to inform the board as to what the action level for the HACs emitted by VY are (the amount triggering further regulation and review) or how close VY's emissions are to those action levels. Since the emissions of HACs are not directly monitored by ANR, it would be helpful to know if their engineering estimates (used to determine whether emissions of HACs are below the action levels) show that VY is approaching the levels wherein further regulation would be required. As this information was not provided, the Board is not able to make a determination as to whether the HACs emitted by VY approach a level that would suggest a potential for undue adverse affects on air purity from continued operation. The Board cannot therefore find with any certainty that Petitioner's burden pursuant to 10 V.S.A. § 6086(a)(1) is met.

The Board should also find that the information supplied by the Petitioner is insufficient to make a finding on 30 V.S.A. § 248(b)(5). The Petitioner states that it is required to file an annual Air Emissions Inventory Report with the Air Pollution Control Division of the Vermont Department of Environmental Conservation, however they fail to include these reports, and have not made any claims regarding what they contain. Goodell Mar. 3 Pf. at 3. NEC remains

[2] It is also unclear as to what concentration of any given toxin provides the basis for a 10 ton threshold. Surely ANR cannot mean that 9.9 tons of pure biocide, or some other extreme toxin, released annually does not meet the regulatory threshold. Conversely, we know that hundreds if not thousands of gallons of toxin bearing spray are released from the cooling towers annually. Moreover, it remains unclear as to whether or not toxin laden spray applied directly (as droplets) to people, plants, and animals should be treated as an air emission regulated by ANR or as a direct application regulated by some other agency or pursuant to some other statute.

concerned that this information, along with the information on which the decision to regulate the VY facility pursuant to an Operating Permit, is all self-reported, and not subject to any direct monitoring by ANR. The Board should not rely only on the information supplied by Entergy, but rather should question how the information is generated, and whether reliance on that information is warranted. *See In re: East Georgia Cogeneration, L.P.*, Docket No. 5179, Order of 6/25/91 at 77 (petitioners cannot meet their burden simply by presenting company witnesses to testify that the proposed project will comply with § 248).

Furthermore, the conclusion reached by ANR witness Mr. Garabedian that "[w]ith regard to air pollution regulated under state and federal Clean Air laws; this faculty (sic) will not create undue air pollution," is not sufficient to establish that the continued operation of VY will comply with the requirements of 30 V.S.A. § 248(b)(5). This statement does not include any estimate as to the potential air pollution that is not regulated by ANR, such as that created by the many vehicles driven by ENVY employees (which will be increasing – see finding 37), or the use of heavy equipment or other potential unregulated sources at VY. These other sources of air pollution, which the Petitioner has not provided any information on, may in fact cause undue adverse affects on air purity when looked at cumulatively. As this has not been done, the Petitioner has not met its burden under 30 V.S.A. § 248(b)(5).

b. Water Pollution [10 V.S.A. § 6086(a)(1)]

Findings:

21. The VY Station withdraws water from the Connecticut River for purposes of cooling the closed-cycle water used to create steam to drive the turbines which create the electricity. This cooling water is then discharged back into the Connecticut River. The discharged

water is "thermally enhanced" meaning it is a higher temperature than when it was drawn into the facility. Goodell Mar. 3 Pf. at 4-5.

22. This use of water from the Connecticut River is subject to regulation by ANR (as authorized by the Federal Clean Water Act), and is subject to a National Pollution Discharge Elimination System (NPDES) Permit. Goodell Mar. 3 Pf. At 4.
23. The current NPDES permit for VY was issued by ANR on September 28, 2004 and expired on March 31, 2006. Ex. ANR-BK-2. It allows up to 543 million gallons of water to be discharged by VY. *Id.*
24. Reissuance of the permit is pending. The EPA Regulations regarding the reissuance of the permit have been appealed to the Supreme Court, which has recently rendered a decision in the case. ANR must await the EPA's response to that decision to see how the regulations might change before they may reissue the NPDES permit to VY. At this time, it is not known whether the new NPDES permit will be substantially the same as, or contain any changes from, the prior expired permit. Tr. 6/2/09 at 15 (Kooiker).
25. The energy output of the VY Station is dependent on, and limited by, the ability to discharge thermally enhanced water into the Connecticut River pursuant to the NPDES permit. If the thermal output exceeds the limits contained in the NPDES permit, VY must reduce the volume and temperature of the thermal discharge by reducing the power output of the facility. *Id.* at 15-16.
26. Heat can have an adverse effect on species of aquatic biota, which have thermal limits for critical functions such as reproduction, and heat waste may inhibit the ability of some biota to survive. Tr. 6/2/09 at 12 (kooiker).

27. In February of 2003, Entergy filed an application with ANR seeking a one-degree increase in the thermal discharge limitations under the NPDES permit. ANR approved the request in part, and denied it in part. The ANR decision has been appealed to the VT Supreme Court, which at this time has not rendered a decision. *Id.* at 13; Goodell Mar. 3 Pf. at 5-6.

Discussion:

The Petitioner has not shown that the continued operation of the VY facility will not cause an undue adverse impact on water resources pursuant to 30 V.S.A. § 248(b)(5), or that it will be in compliance with applicable Clean Water Act permits. At this point in time, VY is operating on a NPDES permit that expired over three years ago, and the reissuance of the permit is pending. It remains unknown as to how the new permit will compare to the previous permit, as the EPA has yet to issue the regulations under which ANR will reissue the permit.[3] This is a cause for concern, and provides no assurance that the continued operation of VY at the current output level will be within the parameters of the new NPDES permit.

As explained by Mr. Kooiker on behalf of ANR, the energy output of the VY Station is dependent on, and limited by, the ability to discharge thermally enhanced water into the

[3] Mr. Kooiker testified that the EPA regulations in question before the Supreme Court govern the withdrawal of river water from the Connecticut River to serve VY, and regard best available technology standards for limiting the entrapment of various aquatic organisms within the cooling water system. However that does not mean that the regulations that EPA finally promulgates will not contain changes regarding effluent limitations as well. Furthermore, limits placed on the intake of river water to protect aquatic biota may inhibit the ability of VY to adequately cool the closed-cycle steam system, or may result in hotter temperatures for effluent due to less volume of cooling water being available. Absent any final ruling on these matters, it remains unclear how VY may or may not be restricted by its NPDES permit, making it impossible for the parties to provide a conclusion on these issues.

Connecticut River pursuant to the NPDES permit. If the thermal output exceeds the limits contained in the NPDES permit, VY must reduce the volume and temperature of the thermal discharge by reducing the power output of the facility. Therefore if the new regulations issued by the EPA require a reduction in the thermal output of ENVY, or if they limit the amount of water intake to the cooling system, then the plant may not be able to operate at its current level. This would affect the environmental and economic benefits claimed by the Petitioner on behalf of relicensing, which are based on current operating levels.

It is therefore impossible for the Petitioner or ANR to provide any assurances to this Board that the continued operation of VY will be within the requirements of their NPDES permit. The Board should therefore find that there is cause to withhold the issuance of a CPG pending EPA and ANR actions necessary for the reissuance of a NPDES permit to ENVY. The parties should have the ability to review and conduct discovery on the NPDES permit once issued, and the Board must be assured that the continued operation of the plant will not violate its NPDES permit. At this point such analysis is impossible, and it is impracticable for the Board to issue a CPG without having the ability to review this important information.

Furthermore, ENVY has sought to increase the temperature output of this water by one-degree, and filed a petition with ANR almost six years ago. The decision by ANR on this request is the subject of a current appeal to the Vermont Supreme Court, and it is not clear what the outcome of this litigation will be, or whether a one-degree increase in temperature will be permissible under the new NPDES permit discussed above. It is likewise premature for the Board to rule on issues pertaining to the potential adverse affects of the continued operation of VY on water resources until this pending litigation is resolved. At this time, it remains unclear at

what temperature water will be released into the Connecticut River, or what limits will be placed on such discharges. The Board must put off making a decision on the issuance of a CPG until such information is made available, and should require the Petitioner and ANR to provide this information, and to make their experts available for questioning once final permits are issued.

c. Global Climate Change

Findings:

28. The VY facility has a capacity of 620 megawatts, which represents approximately 1.85% of the 38,000 megawatt capacity of the New England Grid. Tr. 5/18/09 at 33 (Lester).
29. President Obama has set a goal to reduce our carbon emissions by midcentury by 80 percent relative to our current rate of emissions. In order to meet this goal, Dr. Lester testified that as many as 200 new nuclear power plants would have to be built. *Id.* at 24, 29.
30. If VY were not relicensed, the energy purchased by VT utilities could be replaced with a combination of other low carbon generating resources, including Hydro and wind. Albert Apr. 24 Pf. Reb. at 2-3.
31. If the VY plant is not able to operate reliably, and if it must be downpowered or shut down due to any reliability or age-management problems, than the environmental benefits of the plant (low carbon emissions) will not be realized. Tr. 5/18/09 at 44-45 (Lester) ("if the plant was required to shut down, the benefits associated with its electrical output would no longer be there.").
32. In Docket 6812, Order of March 15, 2004, the Board found the following (Findings 45 and 46 at Page 33):

45. The radiological and other negative impacts from the nuclear fuel cycle offset any benefits from avoided air emissions. However, that "offset" is not readily quantifiable. Sherman pf. 8/19/03 at 20.

46. The major societal externalities from nuclear and fossil fuel generation of electricity (*i.e.*, global warming, air pollution, releases from uranium mining, and fossil fuel effects in the nuclear fuel cycle) affect society in general rather than Vermonters specifically. These uncertain externalities are not an appropriate basis to demonstrate an economic benefit to the state and its residents under Section 248(b)(4).

Discussion:

The Petitioner has gone to great lengths to convince this Board that global climate change is an incredibly important issue in this proceeding, and they intone that the continued operation of VY will provide some semblance of a solution to this problem. This argument obscures the real issues at hand, which is whether relicensing this one small and aging plant is in the public good, and provides no basis for the relicensing of VY.

While NEC would agree that VY generates electricity with less resulting carbon emissions than traditional coal or gas-fired power plants, that does not mean that the continued operation of VY represents the only, or even any, solution to global climate change from greenhouse gas emissions. In fact, the VY facility represents less than 2% of the electricity generated in the ISO New England grid, thereby making it a very minor contributor to power generation in the region, and an insignificant contributor when viewed on the national or international context in which global climate change must be viewed (especially when at least

200 new nuclear plants would be needed to accomplish the Obama administration's goals according to Dr. Lester).

Furthermore, witnesses for the Department have made it clear that the electricity purchased from VY by Vermont utilities would be replaced in the short-term by a mix of fossil and non-fossil fuel burning sources, but that it is possible over the next few decades to replace that power with renewable generation in-state. Albert Apr. 24 Pf. Reb at 2. The future of reducing greenhouse gas emissions does not lay in the relicensing of old and unreliable nuclear power plants. As the Vermont Energy Plan indicates, the future is in other renewable generation, such as wind and hydro. By relicensing VY, the Board would be establishing decades of status quo reliance on technology that most Vermonters do not support. By not relicensing VY, the Board may help to launch Vermont into the future, and help to incite new renewable generating resources to supplant VY.

There is a further fundamental issue of reliability inherent in this debate. Should the plant cease operating due to system or component failure, or should the owner decide that due to low market prices or high expenses (such as component replacements) to shut down VY, the carbon benefits flaunted by Dr. Lester on behalf of Entergy would cease to exist. Due to the significant issues regarding reliability at VY (discussed below), the Board should not be convinced that VY can or will operate for a full 20 years even if the CPG were granted. Therefore while Dr. Lester might argue that even this one plant, with an almost insignificant affect on global climate change, plays its part in the overall efforts to curb greenhouse gas emissions, the Board should put little weight into that, as it is unclear how long the plant may actually be in operation.

Vermont is at a crossroads – we can choose to put off moving away from VY for decades, or we can spend the time and money now developing new technologies and implementing the renewable generating facilities that are the true future of reducing global climate change. The Petitioner has not shown that the continued operation of this one small facility will have any real affect on global climate change, and the Board should not find that this provides a quantifiable benefit that can be weighed against the many costs of continued operation of an aging nuclear plant and the extended SNF storage facing Vermont if a CPG is issued. *See In re: Entergy Nuclear Vermont Yankee, LLC*, Docket No. 8812, Order of 3/15/2004 at 33.

d. Wetlands [10 V.S.A. § 6086(a)(1)(G)]

Findings:

33. There are class II wetlands on the non-operational portion of the Project site, as well as other regulated wetlands in the vicinity of Vermont Yankee. Goodell Mar. 3 pf. at 12; Ex. EN-JG-7.
34. The Vermont Agency of Natural Resources (ANR) regulates class I and II wetlands in Vermont. Tr. 6/2/09 at 30 (Quackenbush).
35. The VY Facility emits chemicals in cooling tower drift, including dodecylguanidine hydrochloride, which is a biocide. Tr. 5/18/09 at 160 (Goodell).
36. ANR does not monitor the wetlands on the VY property or in the vicinity for any concentration or effects of chemicals emitted by VY on the wetland ecosystems. Tr. 6/2/09 at 30-31 (Quackenbush).
37. The Petitioner has provided maps of wetlands on the project site, however no information regarding monitoring of those wetlands, or any testing for chemical concentrations has

been submitted by Petitioners. *See* Goodell Mar. 3 Pf. At 11-12; Ex. EN-JG-7 and EN-JG-8.

Discussion:

The Petitioner has not met its burden to show that the continued operation of the VY facility will not have an adverse affect on wetlands. The cooling tower drift contains potentially harmful chemicals, and no monitoring is being undertaken by the Petitioner or ANR to assess potential adverse affects on wetland biota.

The Petitioner has further provided no information regarding wetlands in the vicinity of the facility, on adjacent properties. There exist wetland areas along the Connecticut River in the surrounding area, and cooling tower drift as well as other particulate or chemical emissions may settle in these wetlands, causing harm to plant and animal life.

The fact that neither the Petitioner nor the VT Agency of Natural Resources conducts testing or monitoring of these wetlands for the potential accumulation of biocides emitted in VY's cooling tower drift is alarming to NEC. Absent any information regarding the settling of biocides in adjacent wetlands and potential bioaccumulation of these chemicals, this Board cannot find that the Petitioner has met its burden pursuant to 10 V.S.A. § 6086(a)(1)(G) to show that there will be no undue adverse effect on wetlands from another 20 years of operation of VY. *In re: Champlain Pipeline Co.*, Docket No. 5300, Order of 8/21/89 at 47 (stating that the petitioner bears burden of proof to show that they satisfy all elements of § 248).

As such, the Board must deny the Petitoners request for a CPG, or at least cause them to conduct and submit a study/report on the environmental and potential health impact of cooling tower drift on wetlands and other waters for the proposed period of extended operation, which

study must be made available to the parties prior to issuance of a CPG and subject to discovery and briefing by the parties. This study should include consideration of the maximum area impacted (extent of drift and runoff from drift impact area), re-concentration due to evaporation, bioaccumulation and the related affects on aquatic ecosystems and organisms.

e. Transportation Systems [10 V.S.A. § 6086(a)(5)]

Findings:

38. VY plans on filling an additional 60 employee positions in the next year or so, and will continue to operate with this increased employment level into the future. Thayer Mar. 3 pf. at 4.
39. The Petitioner has conducted no transportation study for this petition, and the Petitioner's expert regarding transportation testified that he is unaware what the Level of Service (LOS) is on the roads in the vicinity of VY, or whether the current LOS is within the required level. Tr. 5/18/09 at 162-163 (Goodell).
40. No analysis was conducted to take into account any additional employees at VY, and the potential increase in daily vehicle trips. *Id.*

Discussion:

The Petitioner has provided absolutely no specific information regarding the affects of the continued operation of VY on the transportation resources in the vicinity of the plant. No study has been conducted for this petition, nor has any testimony been entered into the record indicating that the current level of service (LOS) is adequate during both normal operation of VY or during refueling outages, when the number of vehicle trips can triple. Tr. 5/18/09 at 165 (Goodell). Rather, the Petitioner simply argues that continued operation will maintain current

traffic conditions; however they have not shown that current conditions are acceptable, nor have they taken into account the addition of 60 employees at VY in the next year. This failure to provide adequate information requires denial of Petitioner's request for a CPG.

The Board should not accept the bald assertion by the Petitioner that continued operation of the VY Station will not cause congestion or unsafe conditions. The lack of any specific study, as well as the failure of the Petitioner's expert witness to take into account planned additional employees or other potential changes to the site or the region over the 20-year license renewal period make this assertion completely baseless.[4] *See In re: East Georgia Cogeneration, L.P.*, Docket No. 5179, Order of 6/25/91 at 77 (petitioners cannot meet their burden simply by presenting company witnesses to testify that the proposed project will comply with § 248).

Absent any valid information to substantiate this claim, the Board must find that the Petitioner has not met their burden to show that there will be no undue adverse effects on the surrounding transportation system per 10 V.S.A. § 6086(a)(5). *In re: Champlain Pipeline Co.*, Docket No. 5300, Order of 8/21/89 at 47 (stating that the petitioner bears burden of proof to show that they satisfy all elements of § 248). Furthermore, without a clear idea of the costs relicensing may impose on transportation services, it is impossible for the Board to carry out a plausible cost-benefit analysis to determine whether a CPG is, on balance, warranted. *Petition of Green Mountain Power*, Docket No. 5823, Order of 5/16/96 at 42 (the Board must base its

[4] NEC further notes that Mr. Goodell – the only witness for the Petitioner to make a claim regarding the effects of continued operation of VY on transportation pursuant to 10 V.S.A. § 6086(a)(5) – is not a traffic engineer, and in fact has no background on conducting traffic studies. *See* Ex. EN-JG-1 (resume of Mr. Goodell providing no experience in traffic or transportation analysis).

determinations on sufficient and credible evidence regarding compliance with the § 248 criteria). The Petitioner's request for a CPG must therefore be denied.

f. Educational and Municipal Services [10 V.S.A. §§ 6086(a)(6) &(7)]

Findings:

41. VY plans on filling an additional 60 employee positions in the next year or so, and will continue to operate with this increased employment level into the future. Thayer Mar. 3 pf. at 4.
42. Increasing the number of employees has the potential to increase the number of students in the surrounding school systems. Tr. 5/18/09 at 166 (Goodell).
43. The analysis provided by Petitioners regarding 10 V.S.A. §§ 6086(a)(6) did not take into account any additional employees at VY, and the associated increased burden on school services in the region. Goodell Mar. 3 Pf. At 15; Tr. 5/18/09 at 166-167 (Goodell).

Discussion:

The Petitioner has not met its burden to show that the continued operation of the VY facility will not have an undue adverse affect on educational resources pursuant to 10 V.S.A. § 6086(a)(6). The analysis provided by Mr. Goodell is incomplete, and incongruous with the information provided by witness Thayer, who made it clear in his testimony that VY will be adding 60 additional employees within the next year. Rather, Mr. Goodell claims in his testimony that Entergy VY informed him that no changes were planned regarding the number of employees, and therefore his analysis and claim regarding this criterion are uninformed and erroneous.

Furthermore, Mr. Goodell – the only witness for the Petitioner to make a claim regarding the effects of continued operation of VY on educational services pursuant to 10 V.S.A. § 6086(a)(6) – has provided no information regarding the current burden imposed by VY on the educational services in the region. While the exhibits provided by Mr. Goodell include ability to serve letters from the Vernon Police Department and Fire Department,[5] no such letter was provided from the school district stating whether continued operation of VY, and the addition of 60 new employees, will have an adverse effect on educational services.

The Petitioner has provided an incomplete and invalid analysis regarding the burden imposed by the continued operation of VY on educational services, and the Board must therefore find that the Petitioner has not met its burden pursuant to 10 V.S.A. § 6086(a)(6). *In re: Champlain Pipeline Co.*, Docket No. 5300, Order of 8/21/89 at 47 (stating that the petitioner bears burden of proof to show that they satisfy all elements of § 248). Furthermore, without a clear idea of the costs relicensing may impose on educational services, it is impossible for the Board to carry out a plausible cost-benefit analysis to determine whether a CPG is, on balance, warranted. *Petition of Green Mountain Power*, Docket No. 5823, Order of 5/16/96 at 42 (the Board must base its determinations on sufficient and credible evidence regarding compliance with the § 248 criteria). The Petitioner's request for a CPG must therefore be denied.

[5] Though NEC notes that the petitioner offered no information on the potential costs to fire and police departments arising from potential acts of terror and/or from potential spent fuel fires, or the potential costs of emergency management.

III. ADDITIONAL ISSUES

1. Decommissioning Costs and SNF Management

Findings:

44. The Vermont State Nuclear Engineer has stated that the remediation of the VY site should be made to the 10 millirem all pathways (4 millirem groundwater) standard, which has been adopted at other nuclear sites, including Maine Yankee. Vanags Feb. 11 Pf. at 12-13.
45. Entergy does not agree to commit to the 10/4 millirem standard proposed by Mr. Vanags because the actual cost of meeting this standard is not known. Thayer Mar. 23 Pf. at 4.
46. The TLG decommissioning cost estimates were based on remediation to the 25 millirem level imposed by the NRC. Tr. 5/19/09 at 66 (Cloutier).
47. The TLG decommissioning cost estimates were based on removal of SNF by the Department of Energy (DOE) beginning in 2020. Tr. 5/19/09 at 18-19 (Cloutier).
48. US Energy Secretary Chu has recently stated that the Yucca Mountain facility is now "off the table." No adjustments have been made to the TLG cost estimates to reflect the fact that no funding will be forthcoming for the construction of a repository at Yucca Mountain, and the potential delay this may cause in DOE's ability to remove SNF from the site. *Id.*
49. DOE is not expected to be able to remove fuel until the 2050-2060 timeframe. Lester Feb. 11 Pf. Reb. at 10.

50. The most significant cost driver in the various scenarios presented by TLG for decommissioning costs is the cost to manage and store SNF. Cloutier Mar. 23 Rebuttal Pf. at 8.
51. The cost to maintain the current dry fuel storage at VY is approximately $4 million per year. Tr. 5/19/09 at 49 (Cloutier).
52. An additional 20 casks of spent nuclear fuel would be generated during the period of the requested license extension. Tr. 5/28/09 at 66-69, 81-83, 86-88 (Mullett).
53. Spent nuclear fuel is the most dangerous nuclear waste. Mullett Nov. 14 Pf. at 6.
54. The TLG cost estimates are based on the cost of decommissioning as if it were to be performed today, and based only on what is known at this time. They do not anticipate what may happen in the future. Cloutier Mar. 23 Reb. Pf. at 5; Tr. 5/19/09 at 24-26 (Cloutier).
55. The TLG cost estimates do not include a safety factor. They include what are called "contingencies," however these are not meant to provide for a margin of error in the cost estimates, and TLG fully expects that the "contingency" will be fully spent. *Id.* at 23-24.
56. The TLG decommissioning cost estimate did not include taxes that must be paid to the Town or the State during decommissioning. Tr. 5/19/09 at 106 (Cloutier).
57. The TLG decommissioning cost estimate included the use of rubblization, a practice which the petitioner has since agreed not to utilize for decommissioning. Tr. 5/19/09 at 62-63 (Cloutier); Tr. 5/20/09 at 71-73 (Thayer).
58. The actual amount of contaminated soils at VY cannot be determined until decommissioning commences. Tr. 5/20/09 at 213 (Thayer).

59. The TLG decommissioning cost estimates used current pricing for the commodities and equipment necessary to decommission and restore the site. The estimate did not take into account for volatility in pricing, or estimate what the actual cost of those commodities and material will be at the time of decommissioning, Tr. 5/19/09 at 55 (Cloutier).
60. No comparison of cost estimates by TLG to actual costs of decommissioning for other plants where TLG had prepared cost estimates was provided. Tr. 5/19/09 at 40-43 (Cloutier); Tr. 5/28/09 at 20-22 (Jacobs).
61. Entergy's decommissioning cost estimates exclude many cost factors. The estimates do not include increased unit prices for inputs to the decommissioning process, nor do they include any safety factor. Chernick Feb 11 Pf. at 13; Tr. 5/20/09 at 23(Cloutier).
62. It is unreasonable for Entergy to rely on the DOE to pay for the cost of storing spent nuclear fuel from operation of the facility beyond 2012. Tr. 5/28/09 at 67 (Mullett); Tr. 5/28/09 at 43-44, 47 (Jacobs).
63. Vermont Yankee has not committed to using any damages that may be awarded from the DOE for spent fuel management. Tr. 5/20/09 at 108 (Thayer).
64. The NRC oversight of decommissioning fund adequacy is based on a non-site-specific formula, which is based solely on the thermal megawatts of the plant. NRC only reviews the adequacy of funds for remediation for license termination, and therefore accounts for only a subpart of the costs estimated by TLG. NRC oversight does not account for spent nuclear fuel management, or site restoration. Tr. 5/19/09 at 56-57 (Cloutier).
65. Entergy and TLG estimate that the cost to restore the site to Greenfield status (non-radiological site restoration) is approximately $40 million. Tr. 5/20/09 at 199 (Thayer).

Discussion:

NEC is concerned that the Petitioner has not provided sufficient information for the Board to make a valid determination regarding the true decommissioning costs of VY, and to therefore assess what actions or conditions are necessary to protect the public from exposure to financial liability. NEC has reviewed and fully agrees with and supports the legal arguments and conclusions made on behalf of CLF regarding the inadequacy of the decommissioning fund and current cost estimates, and the need for additional contributions from the Petitioner. NEC further agrees with Mr. Vanags, the State Nuclear Engineer, that the decommissioning of VY should provide for remediation to the 10/4 millirem standards, rather than the 25 millirem standard imposed by NRC, and with Mr. Lamont that the decommissioning analysis should be undertaken every 2.5 years, in order to provide an updated review of potential shortfalls in the fund. NEC provides the following additional comments.

The decommissioning cost analysis provided by TLG in this matter is woefully inadequate. It fails to include many potential costs, such as taxes, and further failed to properly assess the potential costs of commodities and materials at the time decommissioning would take place. The estimate includes the use of rubblization, which Entergy has since agreed not to perform, and only provides for site remediation to the 25 millirem all pathway standard, rather than the 10/4 millirem standard that the State Nuclear Engineer recommends. It is also troubling that TLG included no error rate or range of potential costs, but rather a fixed cost that included no safety factor to account for potential future increases. It is not enough that the costs will be reviewed every five years – the Board must make its decision now, based on the information in front of it. As that information is clearly incomplete, the Board must find that the Petitioner has

not met their burden. *Petition of Central Vermont Public Service Corp.*, Docket No. 4782, Order of 4/10/86 at 7 ("The burden of proof is, of course, upon the petitioners with respect to each element of their case.").

NEC's chief concern, however, is that the Entergy and TLG cost estimates were done without any analysis or reference to actual decommissioning costs at other sites (or potential benefits, such as employment, local purchase of goods and services, etc.), and therefore conducted without regard to any real world analysis. There is further no indication that TLG cost estimates provide a valid basis when compared to actual results from decommissioning experiences – in other words, the Petitioner has not shown TLG's cost estimates to be accurate as applied to subsequent decommissioning efforts that have been completed in recent years.

It is somewhat perplexing how TLG can put a final number on the cost to decommission VY – not a range of costs, but an actual stated amount – without having looked to what the experience was at other sites that went through this process. NEC finds that to be unacceptable, and the Board cannot rely on the accuracy of the TLG cost estimate in making their decision. *Petition of Green Mountain Power*, Docket No. 5823, Order of 5/16/96 at 42 (the Board must base its determinations on sufficient and credible evidence regarding compliance with the § 248 criteria).

The Board should further not rely on NRC oversight regarding decommissioning fund adequacy, as the Petitioner suggests. Mr. Thayer repeatedly stated that the Board should put faith in the NRC process; however such faith would be dangerously misplaced. Not only has the NRC itself found the decommissioning fund to be inadequate, but their review is based on substantially different end goals for decommissioning, and thus different target amounts for fund

adequacy. The NRC is only concerned with radiological decontamination of the site, and their cost analysis does not include site restoration, which has been stated to be as much as $40 million. Furthermore, the target amount the NRC uses to analyze fund sufficiency is based on a non-site-specific formula, which does not take into consideration site specific issues, such as the cost to remediate contaminated soils, the amount of which cannot be known until decommissioning commences.

It would therefore be folly for the Board to relinquish its duty to the people of the State of Vermont by placing too much significance on the NRC oversight process regarding fund sufficiency. The NRC has different interests, and while they might have the ability to extract funds from Entergy (or Enexus – if they have any funds) as a parent corporation in the face of a fund deficiency at the time of decommissioning, NRC would not be concerned with site restoration, thus leaving Vermont with a potentially unrestored site. This would not be consistent with the Sale MOU, and the Board must ensure that Vermont is not left holding the bag.

NEC believes that the Board must ensure that any shortfalls in the decommissioning fund be borne by Entergy, and agrees with the conditions proposed by Mr. Chernick on behalf of CLF, as well as those proposed by the DPS witnesses that close tabs must be kept on the decommissioning fund, and any shortfalls be subject to payments by Entergy. However, in order to determine what the actual costs of decommissioning will be, and therefore to what extent the funds may be short, the Board should require the Petitioner to conduct a study/report on the cost and quality of nuclear power plant decommissioning in Massachusetts, Connecticut, and Maine. This should include the cost of irradiated nuclear fuel and greater-than-class-C storage, and the cost of site restoration (beyond radiological decommissioning) to Greenfield status. The

study/report should also include consideration of applied residual radiation standards, decontamination to the 10/4 millirem standard as recommended by Mr. Vanags,[6] and complete structure and debris removal, with no rubblization.

This information must be utilized in the decommissioning cost analysis for VY in order to provide a more complete and accurate assessment of the funds needed to remediate and restore the site to the promised Greenfield status. Having failed to incorporate any information from actual decommissioning activities at other sites and the true costs of these efforts, the TLG estimates cannot be said to an accurate portrayal of the costs to decommission VY, and the Petitioner has not met their burden in this matter.

NEC further believes that the Petitioner's reliance on receiving funds from DOE for spent fuel management are speculative at best, and that at this time, the Board should only consider cost estimates that do not include the payment of damages by DOE.

The primary cost driver between the different decommissioning scenarios is the storage of SNF on-site, which are driven by the schedule for DOE to begin removing SNF from the site. Due to the recent shift in policy, and the tabling of Yucca mountain as a repository, it seems as if current calculations regarding DOE's ability to remove SNF from the site need to be reconsidered, with some witnesses stating that a 2050-2060 timeframe seems reasonable for DOE to begin removing SNF, rather than the 2020 date used by TLG in their cost analysis. This will require SNF to remain on site well past any previous predictions, with continued operation

[6] It also remains unclear how TLG can claim to provide a precise cost estimate to remediate the site to the 25 millirem standard, yet that they are unable to determine the cost to remediate to the 10 millirem standard recommended by Mr. Vanags. Either this suggests that they should be able to provide a cost estimate to the more stringent standard, or else their current cost estimate is unreliable.

of VY only adding to the amount and time SNF will be in Vermont. As this is a significant cost driver, potentially adding as much as $4 million per year to VY's costs, that difference may be result in as much as $160 million dollars for the storage of SNF on site.[7]

The Petitioner claims that the funds necessary to store SNF on-site will be recouped from DOE under their obligations pursuant to the Standard Contract between DOE and nuclear facilities. At this time, DOE's liability has been established for its failure to remove SNF as promised in the Standard Contract, however Entergy has only recently submitted its briefs regarding the damages phase of that case, and therefore it remains unclear exactly how much, if any, of the funds spent to store SNF at VY will actually be recouped by Entergy.

The current litigation with DOE, moreover, only involves claims for the storage of SNF already generated and stored at VY, and no liability has yet been found, nor any damages awarded to any nuclear operator, for fuel generated during an extended license period should DOE continue to fail to remove it from the site. Mr. Mullet has provided in his April 24 rebuttal testimony at page 10 a concise and convincing argument as to why recovery of funds for the storage of SNF generated during an extended license period may be difficult for Entergy, due to those costs not being foreseeable, and due to the additional fuel generated from extended operation being the result of an independent business decision on the part of Entergy. NEC confers with this analysis, and believes that that Board should consider the speculative nature of these damages, and not accept the Petitioner's claims that the decommissioning cost analysis may be mitigated by the potential for recovery from DOE.

[7] This assumes a 40-year lag in DOE removal, from the previous estimate of fuel pickup starting in 2020 to the current estimate of 2060. This number could be much higher if a second ISFSI is required, which would presumably add an additional $4 million per year in costs for SNF storage and management.

It is further troubling that even in spite of decommissioning fund shortfalls, Entergy has made no pledge to make any funds that may be recovered from DOE available for decommissioning or future SNF storage at VY. NEC believes that it would be in the best interests of the State if these funds were dedicated to SNF management and decommissioning in order to help assure that these funds are adequate.

In summary, NEC believes that the current decommissioning cost analysis fails to capture the true costs to decommission and restore the site to greenfield status, and that the Board must require the Petitioner to provide a more accurate estimate, which should include the cost to remediate the site to the level proposed by the State Nuclear Engineer, the promise by the Petitioner not to utilize rubblization, and an anticipated date for removal of SNF by DOE of 2050-2060. This will allow the Board to get a more accurate picture of the current shortfall in the decommissioning fund, and to provide for specific remedies, such as contributions by Entergy. NEC further believes that this issue must be revisited more often than every 5 years, and in order to assure the public that they will not be left footing the bill, periodic payments by Entergy must be made to resolve any deficiencies. Lastly, NEC believes that regardless of when VY ceases operations, prompt DECOM should begin immediately thereafter, and the Board should require Entergy to post a bond (or letter of credit) within one year of a decision in this Docket to cover any shortfalls in the decommissioning fund at the time of shutdown.

2. Reliability.

Findings:

66. Entergy admits that whether the plant can be operated reliably is a central component to the issuance of a CPG, and the reliable operation of the plant is central to the arguments

made by Entergy regarding the benefits the VY facility provides Vermont. Tr. 5/26/09 at 142 (Colomb).

67. The Board was presented with information regarding reliability through the Comprehensive Reliability Assessment (CRA), conducted by NSA through DPS pursuant to the VT legislature's requirements in Act 189.
68. The CRA report provided a vertical assessment of only 6 of the 69 systems at VY. Tr. 5/28/09 at 151 (DPS Panel).
69. Most or all of the 69 systems at VY are important to the continued operation of the plant into the relicensing period. Tr. 5/26/09 at 82 (Colomb).
70. Mr. Colomb, the current Site Vice President for VY and the person put forth by Entergy to discuss the CRA and provide their response, was unable to explain to the Board what a "vertical assessment" would comprise. *Id.* at 99-103.
71. The NSA team spent approximately 8,000 hours reviewing the VY facility and records. The cost for this effort was approximately $2.5 million. The NSA team consisted of over 30 personnel with specialized knowledge of specific systems. Tr. 5/28/09 at 157-158 (DPS Panel).
72. The NSA report identified various shortcomings in VY's management and system performance, and created a list of principle conclusions indicating problems that VY must resolve and areas where VY needs to improve. The NSA team made clear that in their opinion, the plant may only be considered to be able to operate reliably into the relicensing period if these recommendations are implemented. Tr. 5/28/09 at 161-162 (DPS Panel).

73. The Petitioner created a matrix from the NSA report recommendations, in order to facilitate implementation and oversight (the "Matrix" found at Ex. EN-MJC-3). Many of the items in that matrix do not have target dates for completion, and all existing target completion dates are outside of the time period for a decision by the Board in this matter. Ex. EN-MJC-3. Some of the items would not be able to be completed until after March 2012, when the relicensing period would begin. Tr. 5/26/09 at 46, 131-132 (Colomb).
74. The Matrix only includes those specific recommendations made by NSA. It is not intended to be a whole complete list of VY's ongoing maintenance and predictive maintenance program. It was also not intended to track license renewal commitments made to NRC. Tr. 5/26/09 at 90 (Colomb).
75. The NSA recommendations comprising the Matrix only provide a "snapshot" of a subset of the issues that VY will need to address for reliable operation into the extended license period. *Id.* at 135.
76. Entergy will rely on internal oversight to ensure timely completion of the actions identified in the Matrix. *Id.* at 44-45. This includes using their Corrective Action Program, and discussion in periodic management review meetings. Tr. 5/26/09 at 92-93 (Colomb).
77. There is no similar tool (i.e. matrix) to track the ongoing maintenance programs or other efforts required for license renewal (by NRC, the State or identified through internal procedures) which could be used to provide transparency and reassure the Board and the public that all actions necessary for reliable operation of the plant are being completed in a timely manner. The state Nuclear Engineer would be required to attend the

management review meetings, and utilize his access to VY's files and the CAP database to track VY's progress on other upgrades (i.e. those not listed in the Matrix) or the implementation of new programs required by NRC for aging management in order to provide oversight on behalf of DPS. *Id.* at 92-94.

78. The DPS Panel stated that third-party oversight of the process of implementing the CRA recommendations is necessary, but no formal means for oversight or reporting to the Board has been created at this time. Tr. 5/28/09 at 168, 171-2 (DPS Panel).

79. The NSA report recommendations do not represent a comprehensive list of everything that needs to be done by VY to ensure reliable operation of the facility into the extended license period. Tr. 5/28/09 at 163-164 (DPS Panel).

80. It is not clear that all of the recommendations contained in the Matrix will in fact be implemented by Entergy. Entergy has made no commitment to implement all recommendations, and has stated that they will address the NSA recommendations; however some may not be implemented. Tr. 5/26/09 at 62-63 (Colomb).

81. The NSA recommendations are meant to improve the performance of the plant, and if the performance does not improve through the implementation of the recommendations, or if the issues identified by NSA are not remedied, then NSA's overarching concerns regarding continued operation of the plant would remain unresolved. Tr. 5/28/09 at 171-173 (DPS Panel).

82. The Public Oversight Panel Report found that the "composition, presentation, and formatting of the <u>majority</u> of VY's procedures do not meet industry standards." POP at ii (emphasis added). VY will not update all of its procedures prior to relicensing, and

currently plans on updating only 250 of its 800 procedures in the next year and a half. Tr. 5/26/09 at 46-47 (Colomb).

83. The number of procedure change requests made by VY employees has increased recently. *Id.* at 50.

84. In 2007 VY experienced an incident with the cooling tower, which partially collapsed when structural support members, made of Douglas Fir, failed. The wood structural members were subsequently replaced with Fiberglass Reinforced Plastic (FRP). This modification was performed utilizing Entergy Fleet Wide Procedures. Ex. DPS-Panel-2 at 4.

85. One of the contributing factors to this event was a less-than-perfect inspection program. Thayer Mar. 3 Pf. at 13.

86. According to Entergy, based on the August 2007 event, inspection methods and procedures were fully rewritten and "successfully implemented." Tr. 5/26/09 at 50 (Colomb).

87. The replacement of the wood structural members with FRP was done under the 'Work at Risk' process, wherein design and installation work proceeded in parallel. *Id.*

88. ENVY Engineering designed the replacement system, however they failed to include detailed work instructions and design drawings for the joint between the FRP structural members and the existing wooden saddle supports. The FRP structural members were not adequately installed, resulting in a second cooling tower collapse in August of 2008. *Id.*

89. The DPS Panel (NSA) identified poor communication between ENVY and the contractor as well as changes made to the design by the contractor that were not known to ENVY engineers as the cause of this event. Id at 5.

90. The Root Cause analysis for this incident found that ENVY failed to verify the contractors design, and that there was poor project communication. *Id.*

91. The DPS Panel stated that the ENVY corporate procedures did not work or were not applied correctly during this incident. Tr. 5/28/09 at 177 (Mr. Woyshner for DPS Panel).

92. The NSA Report (CRA) contains a list of 39 programs required for aging management. The tables indicate that 17 of these programs are already in place and require no enhancement. 13 of these programs exist, but require enhancement. 9 programs are required to be implemented that do not already exist. *See* NSA Report, Tables 2, 3 and 4. This information was supplied by Entergy, and not subject to scrutiny by the NSA team. Tr. 5/28/09 at 183-184 (DPS Panel).

93. Entergy has committed to implementing and/or enhancing these 39 long-range programs by 2012, as part of its commitment to the NRC for an extended license, however these items do not appear in the matrix found at Ex. EN-MJC-3. *Id.*

94. Two of the programs that Entergy has claimed require no enhancement are the BWR Feedwater Nozzle Program and BWR Penetrations Program. NSA at 66, Table 2. Both of these programs were found by the Atomic Safety and Licensing Board to be inadequate for the period of extended operation. NEC-Cross-5.

95. Aging Management requires monitoring equipment for the affects of age, such as wear and breakdown of motors, pumps, bolt integrity, reactor vessel embrittlement, and large components such as the condenser. Tr. 5/26/09 at 103-104 (Colomb).

96. Entergy VY does not have a Comprehensive Aging Management Plan in place at this time, and will not have one in place until 2012. NSA at 65; Tr. 5/26/09 at 105-106 (Colomb). Entergy has committed to creating such a plan, consistent with the Generic Aging Lessons Learned (GALL) report (NUREG-1801) issued by NRC. NSA at 65.

97. Entergy VY Site Vice President Mr. Colomb was unable to explain to the Board what the GALL report was, or exactly how the VY Comprehensive Aging Management Plan would be consistent with the GALL report, as promised by Entergy. Tr. 5/26/09 at 107-108 (Colomb).

98. Entergy does not currently have a Comprehensive Integrated Asset Management and Long Range Planning Program (or Long Range Asset Management Plan) in place to ensure that it meets its commitments to NRC regarding relicensing. Creating such a program is in Entergy's long range plan, however they are just beginning this process, and will not complete the plan until after the Board has made its decision regarding relicensing, and potentially not until 2012 or even later. *Id.* at 108-109.

99. The Long Range Asset Management Plan and the Comprehensive Aging Management Plan are used by VY to ensure continued safety and reliability of the plant. Id at 109. Neither of these programs are in pace at this time (see above).

100. The Public Oversight Panel report specifically found (in agreement with NSA) that there is a need at VY "for a more comprehensive and integrated asset management and long

range planning program, and [] that continuing State verification must monitor the implementation of these aging management programs." POP at 9.

101. The nuclear industry utilizes a standard Equipment Reliability Index (ERI) to track the reliability of equipment at nuclear plants. ENVY first adopted the ERI in September of 2008. Tr. 5/26/09 at 111 (Colomb).

102. When the ERI was initially adopted at VY, the site ranked in the bottom quartile of the industry. *Id.* The Public Oversight Panel specifically found that ENVY has been slow to adopt the ERI, and showed concern regarding their low performance. POP at ii.

103. Prior to adopting the ERI, VY used an internal (fleetwide) process to monitor equipment reliability. This index was similar to the ERI, with some differences, although Site Vice President Mr. Colomb was unable to explain those differences. Entergy knew prior to adopting the industry ERI that there were elements of their performance that ranked in the bottom of the industry. Tr. 5/26/09 at 112-114 (Colomb).

104. Entergy plans on improving their performance under the ERI, however it is not clear how the Board or public would be made aware of this information. *Id.*

105. One of the events that NSA reviewed was a previous transformer fire at VY. At this time, VY has a spare transformer that is not fully operational, and which if needed would allow the plant to operate at only 80% power. Tr. 5/26/09 at 51-52, 152 (Colomb).

106. If a new transformer is required, it would take 18 months or more to receive and install it. *Id.* at 65.

107. Entergy tracks problems at VY using a Corrective Action Program (CAP) database. Entergy allows for corrective action items in CAP to be closed out when work orders are

issued for a repair or other action, prior to that repair actually being undertaken. Tr. 5/26/09 at 56-57 (Colomb).

108. Entergy's long range plans include replacement of the condenser, which has been deemed unreliable for operation through the 20 year relicensing period. Entergy plans on replacing the condenser sometime in 2013 or 2014. Tr. 5/26/09 at 115-116 (Colomb).

109. The ongoing problems associated with in-leakage in the condenser and condenser tube wear and erosion could cause short-term reliability problems during the next three years of operation under the existing license. *Id.* at 116.

110. If the condenser loses efficiency, the plant would have to reduce power output, especially if the condenser were to not be operating properly during the summer months. *Id.* at 117. Should the condenser fail, the plant would most likely have to shut down until it was replaced. *Id.* at 117-118.

111. The NSA Team found that the current condition of the condenser is posing a challenge to both near term and long term reliability at VY. NSA at 4. They also note that Entergy has put off re-tubing or replacing the condenser until after the decision is made regarding relicensing. *Id.*

112. If the condenser were to fail within the next three years, and VY was not relicensed, the plant would have to conduct a cost/benefit analysis in order to determine whether replacing the condenser for three years of operation was worth the costs. Tr. 5/26/09 at 120-121 (Colomb).

113. This holds true for any other potential major component replacements that may be required during the period of extended operation. Entergy would need to do a

cost/benefit analysis in order to make the decision whether to replace any failed major component, rather than shutting down the plant. VY's cost/benefit analysis would greatly depend on the price they were getting for the sale of electricity. *Id.* at 123-126.

114. Entergy has stated that it is their plan to replace the condenser in 2014, however they have made no guarantee that this will take place in 2014, and plan on performing a cost/benefit analysis based on the ongoing operations of the condenser to determine the appropriate time to make the investment in a new condenser. During the next refueling outage they will be placing 24,000 sleeves into the condenser tubes to mitigate the wear and erosion on the condenser tubes, and while this is a temporary short-term fix to a long-term problem, it may extend the life of the condenser, making replacement in 2014 avoidable under ENVY's cost/benefit analysis. *Id.* at 184-188.

115. The Public Oversight Panel found that ENVY had a higher-than-expected preventative maintenance backlog. POP at iv. Entergy admits that its preventative maintenance backlog does not meet "excellence in the industry" standards. Tr. 5/26/09 at 127 (Colomb).

116. Several events have occurred in recent years at VY that have affected the reliability of plant operations. These include:

    a. A transformer fire in 2004, caused by a mechanical failure in the generator system, and the root cause was found to be an inadequate inspection program which failed to identify the problem and ensure reliability. Tr. 5/26/09 at 136 (Colomb).

b. The 2007 cooling tower collapse caused by inadequate inspection and maintenance programs. *Id.* at 137.

c. The subsequent 2008 cooling tower incident, caused by inadequate engineering evaluation and contractor oversight. *Id.* at 138.

d. Turbine stop valve incident, wherein a stuck stop valve was hit with a mallet tripping all of the valves and causing a SCRAM event, caused by inadequate troubleshooting and oversight. *Id.*

117. DPS witness Lamont made it clear that the risks associated with operating Vermont Yankee on an extended license are more certain than the benefits. Tr. 6/3/09 at 51 (Lamont).

118. Mr. Lamont: "There is a growing perception among the public that the current operators of the plant are incompetent." *Id.* at 52.

119. The VY plant management and organization will not change as a result of the spin-off to Enexus (if approved). Tr. 5/20/09 at 179-180 (Thayer).

Discussion:

There is good reason for the ongoing public perception that the VY facility is not being operated safely or reliably, and that the managers of the plant are incompetent. It is therefore no comfort that Entergy witness Thayer promised that the same people will be in charge when plant ownership is transferred to Enexus. Over the past few years, we have read article after article in the news discussing events at VY, from cooling tower collapses, to transformer fires, crane failures and other mechanical and managerial failings that rightly cause concern for the future. Entergy has come to this Board to request an additional 20 years of operation of an aging nuclear

power plant now operating at 120% of its thermal design capacity (due to the uprate). It is clear from the operational history of the plant, that allowing VY to operate on an extended license is simply not in the public good.

Furthermore, the reliability of the VY facility is central to this matter in several ways, and the Board cannot issue a CPG unless it is completely convinced that the plant can and will be reliably operated through the extended period of operation. The various economic and environmental benefits that have been put forth by Entergy as a basis for relicensing are dependent upon the plant operating at a very high capacity factor, which requires reliable operation. Should the plant have to be downpowered or taken off-line for extended periods of time, or for that matter if the plant is shut down due to a catastrophic event or simply due to the expense of necessary repairs, those benefits disappear. The risk of such events occurring will only increase as the plant ages.

A prime example of this is the condenser, which has had ongoing problems associated with in-leakage and condenser tube wear and erosion. Entergy's long range plans include replacement of the condenser, which has been deemed unreliable for operation through the 20 year relicensing period, and plans on replacing the condenser sometime in 2013 or 2014. The current condition of the condenser could cause short-term reliability problems during the next three years of operation under the existing license, and Entergy will be sleeving portions of the condenser tubes during the next refueling outage.[8]

ENVY Site Vice President Mr. Colomb stated that if the condenser were to fail within the next three years, and VY was not relicensed, the plant would have to conduct a cost/benefit

[8] Entergy has further not stated whether sleeving will reduce the thermal efficiency of the condenser and whether this could result in a loss of electric generating capacity.

analysis in order to determine whether replacing the condenser for three years of operation was worth the costs. This would seem to hold true for any other potential major component replacements that may be required during the period of extended operation. Entergy would need to do a cost/benefit analysis in order to make the decision whether to replace any failed major component, rather than shutting down the plant. If ENVY decides that sleeving the tubes provides an adequate short-term solution, they may decide to put off the replacement, and if it gets put off long enough, it may be more economical to shut the plant down rather than replace it as the end of license approaches. This is precisely why issues of reliability and aging management must be carefully measured by the Board in deciding whether the continued operation of VY is in the public good, or what conditions to place on a CPG to ensure reliable operations in the future.[9]

The Board has been presented with an incredible amount of information regarding the issue of reliability; however NEC fears that this information only scratches the surface of what has been an ongoing series of problems at VY. Much of the information put before the Board is from the Nuclear Safety Associates (NSA) report, sponsored by DPS (references to the CRA are made to the January 15, 2009 Redacted Public Version). While the NSA report has been termed a Comprehensive Reliability Assessment (CRA), NEC does not believe that the CRA is fully comprehensive of the many items that Entergy must accomplish in order for this Board to find that the plant could be operated reliably for an additional 20 years.

[9] NEC highly recommends requiring that the condenser be replaced prior to the end of 2014, should the Board issue a CPG, in order to ensure the reliability of this vital plant component in the future.

Additionally, there is no need for the Board to limit its investigation regarding reliability to the NSA report, as Petitioner's counsel has previously suggested. The Petitioner has taken the position, in response to several NEC discovery requests, that the investigation and discussion of reliability by the parties would be at cross purposes with the intent of Act 189.[10] The Petitioner has therefore provided almost no evidence regarding plant reliability outside the scope of the CRA. Based on the Petitioner's repeated objection, NEC expects the Petitioner to argue in their brief to limit the ability of the Board to fully consider the important matter of reliability, and to suggest that the Board's review of reliability is somehow limited by Act 189. This is inconsistent with the Board's statutory mandate.

Issues regarding reliability and the physical condition of the VY systems and components are central to the Board's task of determining whether or not to relicense the VY facility. In order to issue a CPG, the Board must find that, generally, the facility will "promote[] the general good of the state," 30 V.S.A. § 231, and more specifically that the investment will result in an economic benefit to the state. 30 V.S.A. § 248(b)(4). The reliability of the VY plant systems, structures, and components is an essential component to determining whether relicensing will

[10] In response to several NEC discovery requests, Entergy counsel stated:

Entergy VY objects on the ground that the information requested in this question is or may be relevant to an issue—the reliability of the VY Station—over which the Vermont General Assembly has asserted direct authority under Act No. 189 of the Session Laws of the 2007-2008 legislative session. Discovery in this docket regarding VY Station reliability issues would be inconsistent and conflict with the intent and processes created by Act No. 189 relating to the Comprehensive Vertical Audit and Reliability Assessment of the VY Station by the audit-inspection team and Public Oversight Panel, as those terms are defined in Act No. 189. Discovery in this docket on reliability issues would, furthermore, be duplicative of the review and document-disclosure process under Act No. 189, causing Entergy VY to expend double resources on an issue that is being addressed under Act No. 189.

provide any benefits and is in the public interests. It is therefore an indispensable factor that must be fully considered by the Board in making its decision.

Nothing in Act 189 in any way alters the ability of the Board to review questions of reliability. While the Legislature, through Act 189, has chosen to investigate certain issues of reliability through the CRA (NSA report) and Public Oversight Panel, there is no clear intent by the legislature to assert sole authority over these matters, as Entergy's objection states. In fact, the Act states that the CRA may be used by the DPS Director of Public Advocacy in its representation of the public interests before the PSB regarding the issuance of a Certificate of Public Good, evidencing an intent to allow reliability issued to come before the Board in its deliberations, but not requiring that the CRA be the only means of doing so. Act 189 §6(e). Clearly the language of Act 189 does not restrict the Board's ability to look at issues of reliability beyond those which the CRA covers, and makes no mention of any intent to alter the scope of the Board's responsibilities under Title 30. As such, issues of reliability remain clearly within the capacity and authority of the Board, and its responsibility to determine whether the relicensing would be in the public good requires a thorough examination of reliability issues.

NEC finds it troubling that the Petitioner has sought to limit the Board's investigation into issues of reliability, and NEC implores the Board not to adopt this myopic view of the subject of reliability. NEC does not believe that Act 189 states or intends to mean that the Board is to delegate or surrender any of its fact finding duties to the audit inspection team or Public Oversight Panel. In fact, the Petitioner's expert witness on reliability, Site Vice President Mr. Colomb, who provided Entergy's response to the CRA, readily admitted that the reliability of the VY plant is a major concern that the Board must consider; that it is central to the environmental

and economic benefits claimed by Entergy for continued operation of VY, and that it would be difficult for the Board to find that relicensing VY was in the public good if it was not able to find that the plant could be operated reliably into the future. Tr. 5/26/09 at 141-142 (Colomb). He further agreed that the reliable operation of the plant is central to Entergy's arguments regarding a Certificate of Public Good, and that reliability is a very complex issue regarding the interplay of many systems and procedures. *Id.* NEC agrees with the statements made by Mr. Colomb, and his testimony regarding the essential role that reliability plays to the Board's decision on a CPG confirms that the Board must not limit its inquiry to the narrow focus of the CRA.

While NEC believes that there is much in the CRA that has value, and that the recommendations of the NSA team must be fully implemented by Entergy in order for the Board to have any assurance that VY can be operated reliably into the relicensing period (as discussed below), NEC does not believe that NSA's recommendations reflect the full spectrum of reliability issues that need to be considered by the Board. To begin with, the CRA provided a vertical assessment of only 6 of the 69 systems at VY, and as Mr. Colomb noted, most, if not all, of those 69 systems are essential to plant operations. Exactly which of the 69 systems were chosen for a vertical review may have been subject to expert input; however this does change the fact that the CRA provides only a snapshot of a limited subset of the systems and components necessary for the reliable operation of VY.

NEC is specifically concerned that many systems or components that are essential to plant reliability were not covered by the CRA. The DPS Panel (which included members of the NSA team) admitted that the NSA report recommendations do not represent a comprehensive list of everything that needs to be done by VY to ensure reliable operation of the facility into the

extended license period. It is therefore crucial that this Board look beyond the CRA in determining whether the plant can be reliably operated through a period of extended operation. NEC suggests that the Board cannot and should not rely solely on the statements of the NSA team and the testimony of the parties to this proceeding. The Board has the ability to conduct its own independent review, and to request more information from the Petitioner. PSB Rule 2.214(B).

Entergy witness Colomb stated that many of the problems that NSA identified, and the subsequent recommendations they made, were items that Entergy had previously identified through their own internal processes. If in fact Entergy already identified certain problems in "preexisting site or fleet initiated plans," then that begs the question as to what issues, other than those identified by NSA, has Entergy itself identified pursuant to its internal planning processes? Entergy, however, was unwilling to share with the Board exactly what other problems they have identified through their own internal processes, or to create a matrix so that the State may track those matters along with the subset identified by NSA. Tr. 5/26/09 at 134-135. This is unacceptable, and indicates that the Petitioner has not put before the Board all of the information necessary to make a determination that the plant can be operated reliably. The Board should therefore question what other aspects of reliability remain unresolved, and whether ENVY has the ability to take the requisite steps to ensure reliability.

Furthermore, there remain specific items clearly not covered by the CRA that are of concern. For example, the CRA did not cover reactor vessel aging or embrittlement. Mr. Colomb stated that "reactor vessels and their internals with age and exposure to neutron flux tend to lose some of their ductility, if you will, which makes them more susceptible to some cracking

phenomena...." Tr. 5/26/09 at 85 (Colomb). This is a major concern for reliability, as the reactor vessel is irreplaceable. In the case of Yankee Rowe, the inability to be able to reproduce aging analyses embrittlement data for its reactor vessel was a major factor in the decision to shutdown permanently. Shadis Apr. 27 Pf. Reb. at 9-10.

NSA also did not look at the BWR Feedwater Nozzle program, or the BWR Reactor Vessel Penetrations program. *Id.* at 94-95. They also did not cover buried electrical cable degradation, and did not do a vertical audit of the electrical system. These are just some examples of the 63 systems not vertically examined by the NSA team, and on which Entergy presented little or no testimony or evidence, that NEC believes to be essential to reliable operation on an extended license.

Many of the above-mentioned systems are considered under part of what is called aging management. Aging management is vital to the ongoing reliability of the facility, as it relates to identifying and resolving issues inherent in plant operations that come about as a result of operating an older nuclear facility. It is therefore imperative that the Board be assured that ENVY can adequately employ the necessary aging management programs to make certain the plant can be reliably operated on an extended license. There are 39 long-range programs that have been identified as necessary for license renewal by the NRC as part of the Aging Management Program. None of these programs, however, were reviewed by the NSA team, and all of the information as to their overall status was provided by Entergy with no validation by NSA.

NEC has several concerns regarding this information. To begin with, it is troubling that NSA relied solely on the information provided by Entergy regarding the status of these

programs, yet included them in the CRA as if the information was definitive and reliable. As it turns out, this information was not reliable. For example, according to Table 2 of the CRA, the BWR Feedwater Nozzle Program and the BWR Penetrations Program are listed as not requiring any enhancement. At the time this information was submitted, however, the Atomic Safety Licensing Board had found these Programs to be inadequate for the period of extended operation, and had requested more information. *See* NEC-Cross-5.[11] The Board should therefore question the reliability of the Petitioner's assertions regarding the status of these programs. Moreover, since NSA apparently did not confirm this information, questions remain regarding what other information was supplied by Entergy to NSA that was relied on and contained in the CRA, but may not have been completely accurate.

Additionally, the information provided by Entergy identifies 13 programs that require enhancement, as well as 9 programs not in place now that are required. NSA Tables 3 and 4. The Petitioner, however, will not have these programs in place and/or improved until 2012 – after the Board must make its decision regarding a CPG. Also, as the enhancement or implementation of these aging management programs are not actual recommendations made by NSA, they do not appear in the Matrix, and we are thus provided no assurances that the State will provide oversight or afford the Board an opportunity to ensure that they are adequately implemented.

As part of the license renewal process before the NRC, Entergy has committed to implement a Comprehensive Aging Management Program, consistent with the NRC's Generic

[11] NEC believes that the BWR Feedwater Nozzle Program was subsequently approved by NRC, however at the time the information was submitted to NSA this was not the case.

Aging Lessons Learned (GALL) report, by 2012.[12] The Board is therefore being asked to decide whether continued operation of this aging nuclear power station is in the best interests of the public absent a Comprehensive Aging Management Program. The Board should not rely on NRC oversight to ensure that proper aging management programs are employed. NRC has different goals than the state of Vermont, and Vermont has previously taken issue with the adequacy of NRC oversight.[13]

While NEC believes that there are matters of reliability that remain unanswered and that the Board should not find that the CRA provides adequate information on all of the various and important issues relating to reliability, NEC does agree with the recommendations of the NSA team, and concurs with their assertion that the Board should absolutely not find that the plant can be operated reliably into the future if all of their recommendations are not fully implemented. NEC does not believe that at this point the Petitioner has shown that they will in fact fully implement these recommendations, and therefore the Board should not find that the Petitioner has provided adequate assurances that they will be able to operate the plant reliably into the extended license period.

NEC is especially concerned that Entergy has made no specific promise to actually implement the recommendations of the NSA team. They have only agreed to consider them;

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[12] NEC notes that ENVY Site Vice President Mr. Colomb mistakenly stated that they had such a program in place already, then recanted that statement and admitted there is no such program in place at this point. Mr. Colomb was further unable to explain to the Board how the program would be consistent with the GALL report, or even what the GALL report is. Tr. 5/26/09 106-107 (Colomb). This confusion makes NEC hesitant to put any faith in the Petitioner's ability to actually live up to its promises regarding aging management.

[13] Including intervening in the Second Circuit Appeals case challenging NRC rulemaking regarding the storage of SNF. *See* Ex. EN-Cross-Mullett-2.

however this provides no assurance that the shortcomings identified in the CRA will actually be resolved. This is unacceptable, and Mr. Allshouse (representing NSA on the DPS Panel) agreed that should Entergy consider the NSA recommendations, but decide not to actually implement them, then NSA would not be convinced that ENVY could operate reliably into the extended period of operation. Tr. 5/28/09 at 162.

As a specific example, the NSA team found that ENVY's practice of closing out corrective actions or condition reports when work orders were opened, yet prior to the work actually being completed to resolve the problem, poses potential problems. *See* Ex. EN-MJC-3 at 10. Entergy, however, in their response to the CRA, argued that this is a standard practice, and that it is acceptable. Ex. EN-MJC-2 AT 17-18. This represents a potential for disagreement, and an example of a recommendation made by NSA that may not be implemented by ENVY after they have the opportunity to "consider" it.

Moreover, several of the NSA team's findings are of particular concern, and suggest that the Board should not place confidence in ENVY to be able to operate the plant reliably in the coming years. For example, NSA and the Public Oversight Panel noted a higher-than-expected preventative maintenance backlog, which indicates that ENVY is not keeping up with the types of actions necessary to ensure reliable operation. The failure to implement timely maintenance was a root cause of repeated power outage and power reduction incidents during Entergy's tenure.

NSA further identified problems with procedure formatting, which was not up to industry standards. They found that many of ENVY's procedures lacked specific guidance, leaving many items open to interpretation by workers. This is especially worrisome given the recent staffing

issues at VY, and the influx of new workers in the Operations and Maintenance Departments. *See* NSA at 2. As NSA noted, the ability of these new workers to do their job effectively is dependent on the availability of detailed procedure guidance. Without such guidance, we can expect more problems in the future, and as the Operations and Maintenance Departments oversee essential components of plant functions, there remains the potential for catastrophic incidences as a result of inadequate procedure quality. With over 800 procedures at VY, and the Public Oversights Panel finding that the "composition, presentation, and formatting of the majority of VY's procedures do not meet industry standards," the reformatting of procedures at VY remains a daunting task that will not be accomplished any time soon.

Additionally, NSA identified shortcomings in contractor oversight at VY, as well as various human performance issues, such as the failure of the Foreign Material Exclusion and Housekeeping programs to meet industry standards. Therefore not only are workers at VY not given adequate procedural guidance, but management is failing to oversee their work to ensure that it is being done correctly. This has resulted in specific disastrous events, such as the cooling tower failures, and continues to pose problems that may cause similar future events should foreign materials find their way into pumps, motors or a fuel cooling channel (for example, loose sheet metal blocked a fuel cooling channel in a sodium-cooled reactor, the Fermi-1, near Detroit in 1966, resulting in a partial melt of the reactor core). Shadis Apr. 27 Pf. Reb. at 9.

Another troubling finding was that ENVY only recently began using the industry standard Equipment Reliability Index (ERI), and that upon adopting the ERI, ENVY ranked at the bottom quartile when compared to the US nuclear industry. This is disconcerting for a number of reasons. Firstly, it means that ENVY has problems with equipment reliability, which

evidences a lack of effective oversight and potentially flawed inspection programs, which have allowed for equipment failures and ongoing system problems. It further means that ENVY has not been living up to industry best practices, and since the ERI is composed of both leading and lagging performance indicators, it shows that ENVY may not be prepared to reliably operate VY on an extended license.

Secondly, ENVY's low ranking on the ERI upon its adoption is indicative of the fact that its internal processes for identifying and responding to problems are inadequate. Prior to adopting the ERI, ENVY relied on its own internal procedures, such as its performance indicator system, to track equipment reliability. While these systems may have indicated that there were ongoing problems at VY, ENVY apparently was unable to either comprehend exactly how bad it was as compared to industry best practices, or else unable to adequately respond to these problems resulting in a staggeringly low ranking on the ERI once adopted. This is therefore more than just a simple matter of plugging a few holes and sleeving a few tubes – it is indicative of ENVY's failure over the past several years to adequately identify and resolve problems at VY, and as a result the plant is not run reliably, and is increasingly likely to experience structure, system, and component failures leading to increased outages and power reductions as it ages.

This is especially troubling considering that Entergy has repeatedly stated throughout the hearings and testimony that the Board can rely on their internal procedures to ensure that the NSA recommendations are addressed, and that they will be able to operate reliably through the extended period of operation. No plant has operated for more than 40 years, and the potential aging management and equipment problems as plant components reach the end of their useful

life will only mean more for ENVY to deal with (especially since the plant is now operating at 120% of its thermal design capacity), and ENVY has not shown that they are up to the task.

It is simply not in the State of Vermont's best interests to allow for 20 more years of mistakes and failures. We have heard repeatedly from Entergy that they learn from their mistakes and of their intent to reform and improve. They then have expressed surprise at each succeeding incident. Entergy itself has identified many of the issues that have arisen during its tenure at Vermont Yankee as being rooted in lack of supervision, poor maintenance, poor communication, and failure to take a lesson from industry experience. Incident after incident shows that they have not learned from these mistakes, but rather demonstrates that we can only expect more mistakes in the future.

The successive incidents at VY under Entergy's tenure provide a telling storyline regarding ENVY's "commitment" to operating a reliable nuclear plant. None is more telling than the cooling tower collapse incidents that occurred in 2007 and 2008. Entergy maintains an almost laughable semantic game to avoid the plain truth that these incidents were the result of systemic and repeated failures at VY by claiming they had different root causes. While it is true that the initial collapse was due to a ridiculously careless inspection program that was not able to identify that the rotten wood holding up the cooling towers might need replacing; and the subsequent collapses were due to the failure of the engineering department to specify how to install the replacements or to oversee the contractors that performed the work, this does not mean that the incidence should be looked at in isolation. The real "root cause" of these incidents is simply an inability to maintain the plant and get important jobs accomplished correctly, and they

evidence nothing less than a failed operational system at VY showing they cannot operate reliably.

This is particularly true since in Docket 6812, New England Coalition, relying on evidence from ENVY in-house communications, argued that the cooling towers were not in good condition and that the design itself was flawed and subject to catastrophic failure (Similar to that which occurred in August of 2007). Entergy said, no, and pointed to the rigor of its periodic examinations – chiding witness Arnold Gundersen for worrying about evidence of a few cracked timbers when these were routinely replaced. *See* Shadis Apr. 27 Pf. Reb. at 6. Of course the subsequent collapse proved otherwise.

So why should we rely on Entergy's repeated promises to upgrade their procedures, improve their performance and learn from their mistakes? ENVY has shown a remarkable ability to repeat mistakes, ignore warnings, and to be content with operating using substandard procedures, with ineffective management and inspection of vital plant components. This Board has little reason to believe that the future holds anything other than what we have seen in recent years – mistakes, oversights and failures to perform not only to industry standards, but to the standards that Vermont should expect from a nuclear power plant in our State.

NEC does not believe that the Board is in a position to find that the plant can be operated reliably, and therefore a CPG must not be issued. The combination of procedural, managerial, and human performance issues at VY suggest a systemic problem, with the potential for cumulative effects that may result in continued problems regarding reliability. The Board should place no reliance on the promises made by Entergy to remedy these situations, and as the Board is unable to ensure that these problems will be resolved prior to the end of the current license

period, they must deny a CPG for extended operation, as it would not be in the public's best interest to allow VY to continue to operate with such glaring defects.

In the alternative, should the Board decide to grant a CPG in spite of such uncertainty regarding ongoing reliability, conditions must be in place to ensure that the many problems identified by NSA are resolved. The reality is that none of the NSA recommendations will be fully implemented prior to the Board's decision in this matter. The Board is therefore being asked to make a decision regarding whether the continued operation of VY will serve the public good, without any explicit assurances that even the NSA recommendations will actually be implemented. NEC believes that this puts the citizens of Vermont at risk, and therefore moves that the Board should find that a CPG may not become effective until ENVY has completed all extended period of operation commitments to NRC and has fully implemented all of the NSA team recommendations to the satisfaction of an independent professional review. The review team should include qualified experts in the technical specialties involved.

Additionally, even if Entergy implements all of the recommendations of the NSA report as contained in the Matrix, it does not follow that all of the concerns of the NSA team will have been addressed. As the DPS Panel stated, the recommendations are meant to improve the performance of the plant, and if the performance does not improve through the implementation of the recommendations, or if the issues identified by NSA are not remedied, then NSA's overarching concerns regarding continued operation of the plant would remain unresolved. Third-party monitoring of the improvements that NSA has identified as being necessary is therefore needed to ensure that Entergy will be able to operate reliably. Tr. 5/28/09 at 171-173 (DPS Panel). NEC agrees with the recommendation made by Mr. Vanags that he is not in a

position as the Vermont State Nuclear Engineer to provide this oversight, and that a third party (possibly NSA) be engaged to provide the requisite monitoring.

The Board should therefore condition any CPG on review of the ability of ENVY to fully implement the recommendations made by NSA, as well as the aging management programs mandated by NRC. This should include an opportunity for the parties in this matter, and the public, to review ENVY's progress towards remedying the problems identified in the CRA, and their implementation of the necessary aging management programs. The Board should provide an opportunity for the parties to reopen these matters if an independent review indicates that ENVY is not improving as required, and the Board should maintain the ability to revoke any CPG if ENVY fails to implement the NSA recommendations or shows that it is not improving its performance.

3. Risk of Harm from Spent Fuel Pool Coolant Loss

NEC has reviewed and fully agrees with the arguments submitted by Mr. Dumont on behalf of VPIRG regarding the Admissibility of Evidence as to Risk of Harm, and concurs that the items marked as Lamont Cross Exhibits 1 and 2 submitted by VPIRG should be accepted by the Board into evidence. NEC further agrees with VPIRG's conclusions regarding Risk of Harm from Spent Fuel Pool Coolant Loss.

IV. ADDITIONAL COMMENTS REGARDING PERMIT CONDITIONS

While NEC believes that the Board should not grant a CPG to the Petitioners, should the Board decide that on balance the continued operation of VY is in the public good, the Board must ensure that safeguards are put in place to make certain that Vermont's interests are protected. Due to exceedingly limited resources, NEC is not able to provide arguments on each

and every subject that we believe this Board must consider regarding the issuance of a CPG to Entergy. NEC does, however, support the following conditions and recommendations made by other parties to this matter:

- NEC agrees with the findings of the Wyndham Regional Commission (WRC) that the Docket 6545 MOU specifically calls for removal of all structures upon the decommissioning of VY, and supports their conclusion that this requires more than a removal of structures to three feet below grade in order to provide for greenfield status. NEC agrees that Entergy's proposed plan to leave subsurface footings or foundations of structures intact below three feet may hamper the reuse of the site, and is therefore inconsistent with the orderly development of the region. Tr. 5/26/09 at 10-11 (Buchanan).
- NEC agrees with the WRC recommendation that decommissioning should occur promptly upon shutdown of the station, and that the SAFESTOR option should not be employed. *Id*. at 35-36.
- NEC agrees with the WRC recommendation that an appropriate site for a second ISFSI be located as part of this Docket, to ensure that a proper site remains available and that the location of a second ISFSI would not adversely affect the ability of the site to be reused in the future. *Id*. at 25-26.
- NEC agrees with WRC that the Board should require ENVY to maintain full core offload capability. *Id*. at 29-30.
- NEC agrees with CLF that any RSA revenues should be used to support incremental energy efficiency and renewables.

- NEC agrees with the recommendations made by the State Nuclear Engineer, Uldis Vanags, on behalf of the Department of Public Service that decommissioning should occur promptly upon shutdown of the station (if allowed to operate until 2032), and that the SAFESTOR option should not be employed. NEC further agrees with Mr. Vanags' recommendation that the Board should require an enhanced clean-up level to the 10 millirem all pathways and 4 millirem groundwater standards, and specifically Mr. Vanags' recommendations found at pp. 12-13 of his February 11, 2009 testimony regarding site restoration.
- NEC agrees with the recommendations made by Mr. Chernick on behalf of CLF that the decommissioning cost analysis should include a safety factor to ensure adequate funding, and that current shortfalls in the fund require an immediate contribution from Entergy to restore the funds to the level that was predicted they would be prior to the current economic decline and subsequent losses to the fund.

NEC further recommends that the Board consider the following:

- It was mentioned during the hearings that new NRC regulations may allow for a further period of extended operation – an additional 20 year license extension. Any CPG issued by the Board should specify that it is only for a specific period, and that any further operations of the plant would require another CPG.
- Should the Board allow for the restructuring proposed in Docket 7404, any CPG issued to Entergy in this Docket should specify that all of the promises, pledges and guarantees made during these proceedings shall be borne by Enexus, or any future owner of the plant.

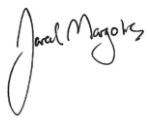
- The Board should provide that any significant nuclear power plant accidents (world wide), structural failures or power reductions at VY, or shifts in US nuclear waste disposal policy, shall result in an opportunity for any party to request reconsideration of ENVY's CPG.
- The Board should require that Entergy work with the State to establish a 20-mile (radius) emergency planning zone for the Vermont Yankee Nuclear power station, and shall annually provide full funding for emergency planning and response therein.

V. CONCLUSION

For the foregoing reasons, the Board should find that the Petitioner has not met its burden to show that continued operation of the Vermont Yankee nuclear power plant will provide tangible economic benefits to Vermont; that they have failed to show that it will not have an undue adverse impact on air, water, wetlands, educational or transportation resources; that they have failed to show that there will be adequate funds for decommissioning; and they have failed to demonstrate that they can operate the plant reliably through the relicensing period. As the Petitioner has not met their burden under the applicable statutory criteria, the Board must deny their request for a CPG.

Dated at Jericho, Vermont this 17th day of July, 2009.

New England Coalition, Inc.



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